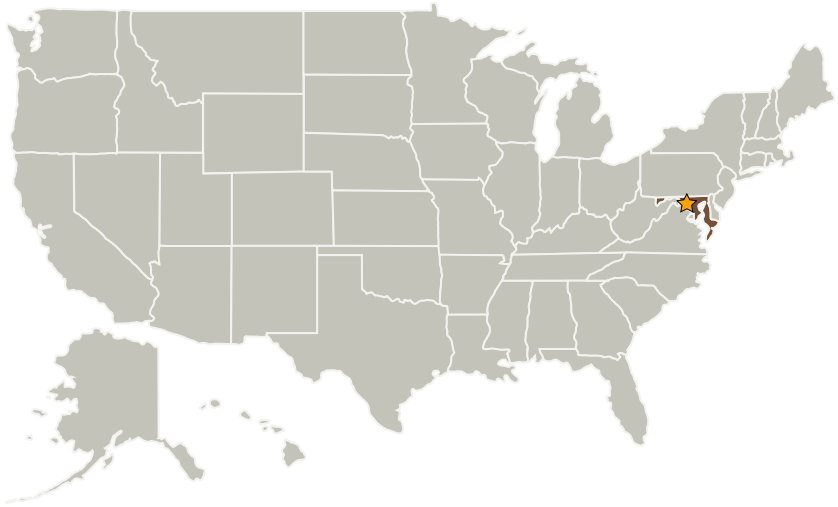
GaN Based UV Sensors for Earth Resources Management, Phase II

Completed Technology Project (2006 - 2008)

Project Introduction

This work represents the exploitation of a unique method of crystal growth -- constrained epitaxy (CE) -- in the manufacture of low-noise, multi-color UV sensors. The sensors developed here are based on the GaN/AlGaN materials system and are sensitive in the wavelength range from 250-400nm. Target responsivities are > 0.1 A/W throughout the spectral interest range. The first arrays produced under phase 1 were sensitive both to 285 and 315 nm simultaneously. Multicolor sensitivity improves background noise rejection and provides much more detailed analysis of atmospheric aerosol scattering. Noise is dominated by diode reverse leakage and is less than 10-9A/cm2. The CE manufacturing process is enabled by the recognition that surfaces on which radiation sensitive materials are grown cannot be exposed to plasma etch effluents. To overcome this limitation, a dielectric lift-off-lithography process was developed. In this process, the growth surfaces only come in contact with organic solvents and photosensitive plastics during manufacture. Initial results were obtained on a 10 x 10 diode array. In subsequent work, we intend to produce 100 x 100 arrays. In addition, it the range of attainable spectral sensitivities will be mapped out by studying the range of achievable AlGaN stoichiometries that are practically attainable.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
TechnoVentures, LLC	Supporting Organization	Industry	Silver Spring, Maryland

Primary U.S. Work Locations
Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes